Certificate of compliance

Test report No.:	ITN-02 008-EMC		
Applicant :	Etronics Corporation.		
Applicant Address :	345-50, Gasan-Dong, Geumcheon-Gu, Seoul, Korea, 153-802		
Product :	MP3 Player		
FCC ID :	P87-ETR0001	Model NO.:	EAM-032
Receipt NO.:	N/A	Date of receipt	Mar. 10, 2002
Date of Issue :	April. 01, 2002		
Testing locatlon :	Etronics Corporation. 461, Tokjeong-Ri, Changan-Myun, Hwaseong-city, Kyunggi-Do, Korea		
Test Standards:	ANSI C63.4 / 1992		
Rule Parts :	FCC Part 15 Subpart B		
Equipment Class :	Class B Device Peripheral		
Test Result :	The above mentioned preduct has been tested and passed.		

Prepared by : H.N.Choi	Tested by : S.S.Oh / Engineer	Approved By : J.W.Cho / Lab. Manager
Signature Date	Signature Date	Signature Date

Other Aspects :	
Abbreviations :	OK, Passed · Fall = falled · N/A = not applicable

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- ∗ This test report is not permitted to copy partly without our permission.
- ∗ This test result Is dependent on only equipment to be used.
- ∗ This test result is based on single evaluation of one sample of the above mentioned.
- ∗ We certify that this test report has been based on the measurement standards that is traceable to the national or International standards.

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1. General

This equipment has been shown to be capable of compliance with the applicable technical standards and was tested in accordance with the measurement procedures as indicated in this report.

We attest to the accuracy of data. All measurements reported herein were performed by Etronics Corp. and were made under Chief Engineer's supervision.
We assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

2. Test Site

Etronics Corporation.

2.1 Location

461, Tokjeong-Ri, Changan-Myun, Hwaseong-city, Kyunggi-do, Korea, 445-944

The test site is in compliance with ANSI C63.4/1992 for measurement of radio Interference.

2.2 List of Test and Measurement Instruments

Table 1 : List of Test and Measurement Equlpment

·Conducted Emissions

Kind of Equipment	Type	S/N	Calibrated until
EMI Reciver	ESS	841432/010	08.2002
Artificial Mains Network	3825/2	8905-1506	08.2002
Conducted Cable	N/A	N/A	06.2002

·Radiated Emissions

Kind of Equipment	Type	S/N	Calibrated
EMI Reciver	ESS	841432/010	08.2002
Spectrum Analyzer	8568B	3019A05457	08.2002
Amplifier	8447F	3113A04584	08.2002
Log Periodic Antenna	UHALP9107	9107846	02.2003
Biconical Antenna	BBA9106	91039103	02.2003
Open Site Cable	N/A	N/A	06.2002
Antenna Mast	EMRT2014	N/A	N/A
Antenna & Turntable controller	EMAT2015	N/A	N/A

2.3 Test Date

Date of Application : March. 12, 2002

Date of Test : March. 13, 2002 ~ March. 31, 2002

2.4 Test Environment

See each test item's description

3. Description of the tested samples

The EUT is MP3 player

3.1 Rating and Physical Characteristics

Frequency response : 20Hz – 20kHz
Memory size : 16/32/64/128(MB)
Power source : 4.2V/570mA, built-in Li-polymer Battery
Output power : 6.5mw + 6.5mw (1kHz,0dB/16Ω)
Dimensions : 61(W)X61(H)X5(T)mm
Weight : 48.5g (battlery included)
Battery run time (fullcharged) : 6Hrs.

3.2 Submitted Documents

N/A

4. Measurement Conditions

The operating voltage of EUT is supplied by a MP3 player

4.1 Modes of Operation

The EUT was in the follwing operation mode during all testing;
The measurement was conducted under down-loading of data and PC operating
Mode with interfaced by PC and USB cable.

4.2 List of Peripherals

Descrlption	Manufacturer	Model Name	Serial No.	FCC ID
Personal Computer	Compaq	Deskpro5120	3511N5	CNT75MDB65
Monitor	Compaq	444T	607BA03BA398	BR8SM-1557
Keyboard	Compaq	RT101	120375-001B	AQ6-MTN4XZ15
Mouse	Compaq	M-S34-6MD	141189-201	DZL210472
Adapter (for printer)	Hewlett Packard	C2182A	060795	N/A
Printer	Hewlett Packard	C2164A	ES64H130ZR	B94C2164X

4.3 Type of Used Cables

Description	Length	Type of shield	Manufacturer	Remark
PC power cable	2.0m	Non-Shield	None	
Video interfacd cable	1.5m	Shield	None	
Keyboard interface cable	1.2m	Non-Shield	None	
Mouse interface cable	1.8m	Non-Shield	None	
Adapter cable	1.8m	Non-Shield	None	For printer
USB cable	1.8m	Non-Shield	None	For EUT

4.4 Test Setup

The test setup photographs showed the external supply connections and interfaces.

4.5 Uncertainty

1) Rediated disturbance

Uc (Combined standard Uncertainty) = ±3.45B

Expanded uncertainty U = Kuc

∴ U = ± 6.9dB

2) Conducted disturbance

Uc = ± 2.18dB

U = Kuc – 2×Uc = ± 4.36B

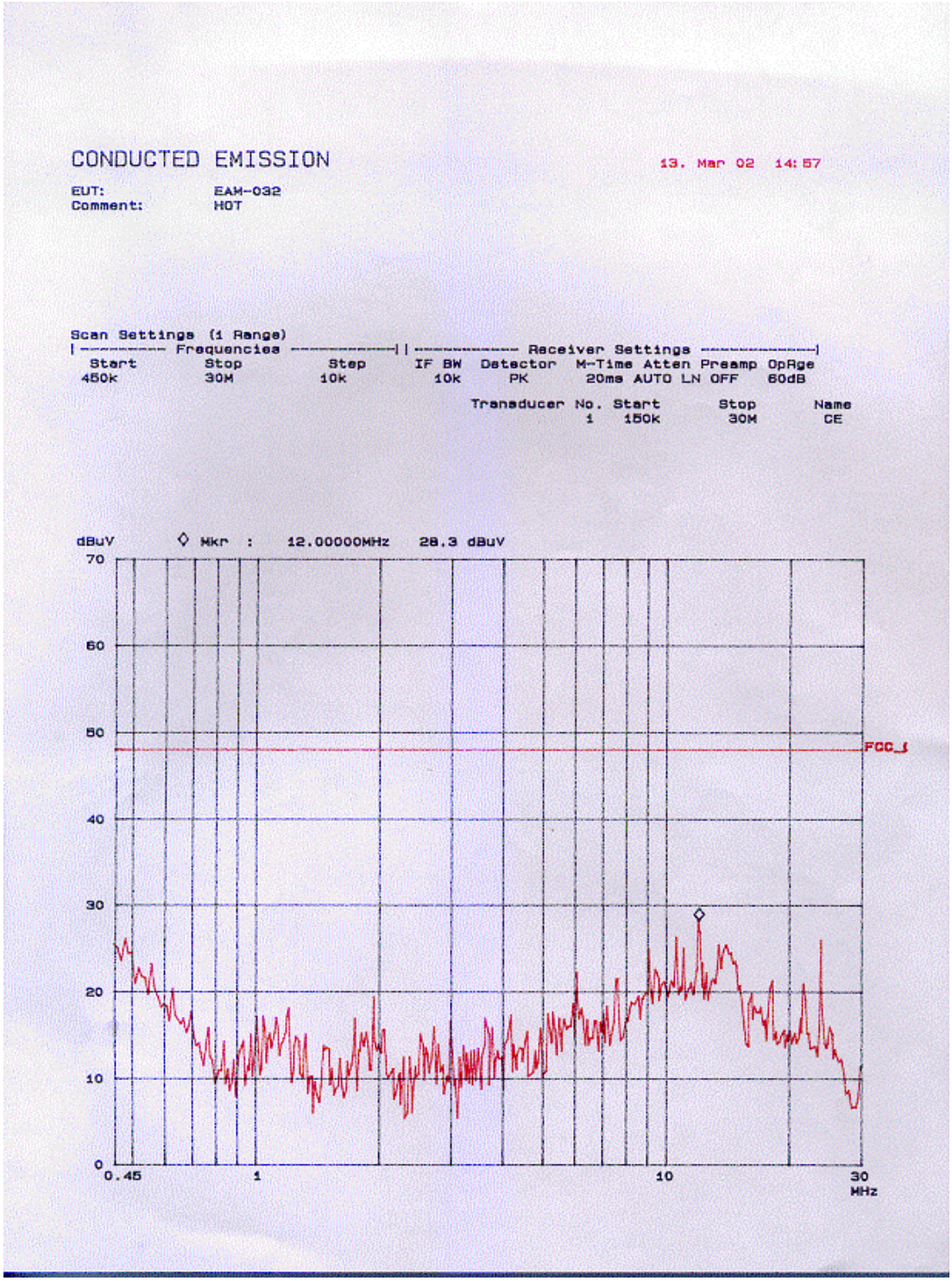
5. Emission Test

5.1 Conducted Enissions

Result : Passed

The line-conducted facility is located inside a 3.0M ×4.0M ×7.0M shielded enclosure.
The shidlding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 604-05.
A1m×1.5m wooden table 80cm. High is placed 40cm away from the vertical wall and 1.5m away from the side wall of the shielded room. EMCO Model 3825/2 (10KHz-30MHz)
50ohm/50uH Lone-Impedance Stabilization Networks(LISNs) are bonded to the shielded room.
The EUT is powered from the EMCO LISN and the support equipment is powered from the EMCO LISN. Power to the LISNs are filtered by a high-current high-insertion loss Lindgren enclosures power line filters.
The purpose of the filter is to attenuate ambient signal interference and this filter is also bonded to the Shielded enclosure.
All electrical cables are shielded by braided tinned copper zipper tubing with inner diameter of 1/2".
If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the EMCO LISN.
All interconnecting cables more than 1 meter were shortened by non-inductive bundling (serpentine fashion) to a 1-meter length.
Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to Warm up to their normal operating condition. The RF output of the LISN was connected to the Spectrum analyzer to determine the frequency producing the maximum EME from the EUT.
The frequency producing the maximum level was reexamined using EMI/field Intensity Meter (ESS) and Quasi-Peak adapter. The detector function was set to CISPR quasi-peak mode.
The bandwidth of the receiver was set to 10kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission.
Each emission was maximized by:switching power lines;varying the mode of operation or resolutiom;
Clock or data exchange speed;if applicable;whichever determined the worst-case emission.
Photographs of the worst-case emission can be seen in photograph of conducted test.
Each EME reported was calibrated using self-calibrating mode.

Figure 1 : Spectral Diagram, Line-PE (HOT)



Fgure 2 : Spectral Diagram, Neutral-PE (Neutral)

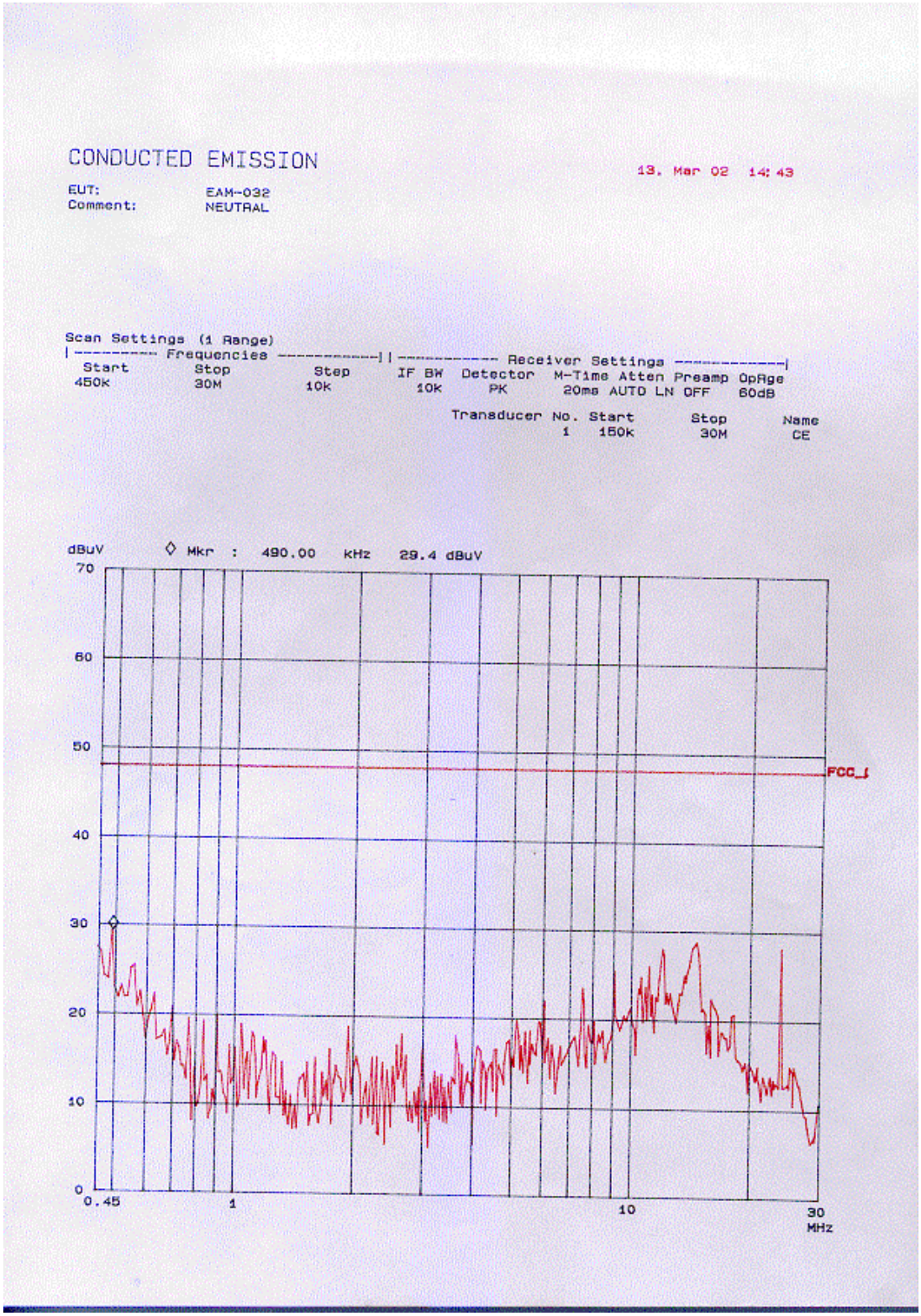


Table 2 : Test Data, Conducted Emissions (32,64,128Mbyte)

Frequency (MHz)	(1)Reading (dB μV)	Line	(2)C/F (dB)	(3)C/L (dB)	(4)Actual (dBμV)	(5)Limit (dBμV)	(6)Margin (dB)
0.49	25.4	B	0.1	0.1	25.6	48.0	22.4
0.70	18.8	B	0.1	0.1	19.0	48.0	29.0
0.91	15.3	B	0.1	0.1	15.5	48.0	32.5
1.95	16.9	B	0.1	0.1	17.1	48.0	30.9
3.64	11.2	B	0.1	0.1	11.4	48.0	36.6
6.07	17.8	A	0.1	0.1	18.0	48.0	30.0
7.55	17.6	A	0.1	0.1	17.8	48.0	30.2
9.10	17.4	A	0.1	0.1	17.6	48.0	30.4
12.0	20.3	A	0.1	0.2	20.6	48.0	27.4
14.0	20.6	A	0.1	0.2	20.9	48.0	27.1
24.0	26.1	A	0.1	0.3	26.5	48.0	21.5

NOTES :

1. All modes of operation were investigated

   and the worst-case emission are reported.

2. All other emissions are non-significant.

3. All readings are calibrated by self-mode in receiver,

4. Measurements using CISPR quasi-peak mode.

5. Line A = LINE-Pem Line B = NEUTRAL-PE

6. C/F = Correction Factor

7. C/L = Cable Loss

Margin Calculation

(6) Margin = (5)Limit - (4)Actual

[(4)Actual = (1)Reading + (2)C/F + (3)C/L]

5.2 Radiated Emissions

Result : Passed

Preliminary measurements were made indoors at 1meter using broadband antennas, broadband amplifier, and spectrum analyzer to determine the frequency producing the maximum EME.
Appropriate percaution was taken to ensure that all EME from EUT were maximized and Investigated. The system configuration, clock speed, mode of operation or video resolution, turntable azimuth with respect to the antenna were noted for each frequency found.
The spectrum was scanned from 30 to 300 MHz using biconical antenna and from 300 to 1000 MHz using log-periodic antenna. Above 1GHz, linearly polarized double ridge horn antennas were used.

Final measurements were made outdoors at 3-meter test range using SCHWARZBECK dipole antennas. The test equipment was placed on a wooden table situated on a 4 ×4meter area adjacent to the measurement area, Turntable was to protect from weather in the dome that made with FRP.
Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-exmined and invertigated using EMI/Fiedl Intensity Meter(ESS) and Quasi-Peak Adapter.
The detector function was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 100kHz or 1MHz depending on the frequency or type of signal.

The half-wave dipole antenna was tuned to the frequency found during preliminary radiated measurements. The EUT, support equipment and interconnecting cables were re-configured to the set-up producing the maximum emission for the frequency and were placed on top of a 0.8meter high non-metallic 1 ×1.5meter table.
The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each EME emission, The turntable containing the system was rotated; the antenna height was varied 1 to 4meters and stopped at the azimuth or height producing the maximum emission.
Each emission was maximized by: varying the mode of operation of resolution: clock or data exchange speed, and/or support equipment, if applicable; and changing the polarity of the antenna, whichever determined the worst-case emission.
Photographs of the worst-case emission can be seen in photograph of radiated emission test,
Each EME reported was calibrated using self-calibrating mode.

Table 3 : Test Data, Rediated Emissions : (128Mbyte)

Freqyency [MHz]	Pol.	Height [m]	Angle [°]	(1) Reading [dBμV]	(2) AFCL [dB/m]	(3) Actual [dBμV/m]	(4) Limit [dBμV/m]	(5) Margin [dB]
42.49	V	3.7	75	15.8	15.7	31.5	40.0	8.5
51.60	V	3.8	80	19.3	12.7	32.0	40.0	8.0
69.89	H	3.9	77	20.2	8.9	29.1	40.0	10.9
88.54	H	3.9	81	24.3	11.0	35.3	43.5	8.2
99.02	H	3.7	90	18.3	13.7	32.0	43.5	11.5
104.80	H	3.5	94	16.7	14.7	31.4	43.5	12.1
116.48	H	3.6	100	17.3	16.5	33.8	43.5	9.7
122.32	H	3.8	121	14.7	17.3	32.0	43.5	11.5
131.13	H	3.7	97	15.2	18.1	33.3	43.5	10.2
157.29	H	4.0	100	15.1	20.0	35.1	43.5	8.4
177.29	H	3.9	105	13.2	20.8	34.0	43.5	9.5
223.80	H	3.4	110	13.1	23.0	36.1	46.0	9.9
278.30	H	3.2	110	11.7	25.3	37.0	46.0	9.0
351.90	H	2.0	60	12.6	23.2	35.8	46.0	10.2

Table. Radiated Measurements at 3-meters

Table 4 : Test Data, Rediated Emissions : (64Mbyte)

Freqyency [MHz]	Pol.	Height [m]	Angle [°]	(1) Reading [dBμV]	(2) AFCL [dB/m]	(3) Actual [dBμV/m]	(4) Limit [dBμV/m]	(5) Margin [dB]
42.49	V	3.6	77	15.0	15.7	30.7	40.0	9.3
51.60	V	3.7	80	19.1	12.7	31.8	40.0	8.2
69.89	H	3.8	80	20.0	8.9	28.9	40.0	11.1
88.54	H	3.9	80	24.5	11.0	35.5	43.5	8.0
99.02	H	3.6	93	18.5	13.7	32.2	43.5	11.3
104.80	H	3.7	91	16.0	14.7	30.7	43.5	12.8
116.48	H	3.7	102	18.1	16.5	34.6	43.5	8.9
122.32	H	3.5	122	14.4	17.3	31.7	43.5	11.8
131.13	H	3.5	97	15.1	18.1	33.2	43.5	10.3
157.29	H	4.0	100	14.9	20.0	34.9	43.5	8.6
177.29	H	3.9	105	13.0	20.8	33.8	43.5	9.7
223.80	H	3.5	110	14.2	23.0	37.2	46.0	8.8
278.30	H	3.0	110	12.0	25.3	37.3	46.0	8.7
351.90	H	2.0	70	13.4	23.2	36.6	46.0	9.4

Table 5 : Test Data, Rediated Emissions : (32Mbyte)

Freqyency [MHz]	Pol.	Height [m]	Angle [°]	(1) Reading [dBμV]	(2) AFCL [dB/m]	(3) Actual [dBμV/m]	(4) Limit [dBμV/m]	(5) Margin [dB]
42.49	V	3.9.	75	14.7	15.7	30.4	40.0	9.6
51.60	V	3.7	80	19.0	12.7	31.7	40.0	8.3
69.89	H	3.7	80	20.4	8.9	29.3	40.0	10.7
88.54	H	3.8	81	23.9	11.0	34.9	43.5	8.6
99.02	H	3.6	85	18.0	13.7	31.7	43.5	11.8
104.80	H	3.4	94	16.5	14.7	31.2	43.5	12.3
116.48	H	3.5	95	17.3	16.5	33.8	43.5	9.7
122.32	H	3.8	120	14.7	17.3	32.0	43.5	11.5
131.13	H	3.7	97	15.1	18.1	33.2	43.5	10.3
157.29	H	3.9	100	15.1	20.0	35.1	43.5	8.4
177.29	H	3.7	100	13.0	20.8	33.8	43.5	9.7
223.80	H	3.2	110	14.1	23.0	37.1	46.0	8.9
278.30	H	3.0	115	11.9	25.3	37.2	46.0	8.8
351.90	H	1.9	60	12.8	23.2	36.0	46.0	10.0

NOTES :

1. All modes of operation were investigated

   and the worst-case emission are reported.

2. All other emission are non-significant.

3. All readings are calibrated by self-mode in receiver,

4. Measurements using CISPR quasi-peak mode

5. AFCL = Antenna factor and cable loss

6. H = Horizontal, V = Vertical Polarization.

Margin Calculation

(5)Margin = (4)Limit - (3)Actual

[(3)Actual = (1)Reading + (2)ACL]